Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	

General Certificate of Education
Advanced Subsidiary Examination
January 2009

Environmental Studies ENVS1

Unit 1 The Living Environment

Wednesday 14 January 2009 9.00 am to 10.00 am

You will need no other materials.
You may use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
  Two of these marks are for the Quality of Written Communication.
- You will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.
- Question 6 should be answered in continuous prose.
  Quality of Written Communication will be assessed in this answer.

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED

Answer **all** questions in the spaces provided.

1 The table describes some of the conditions necessary for the evolution of complex life on Earth.

Complete the table by selecting the appropriate letter from the list below.

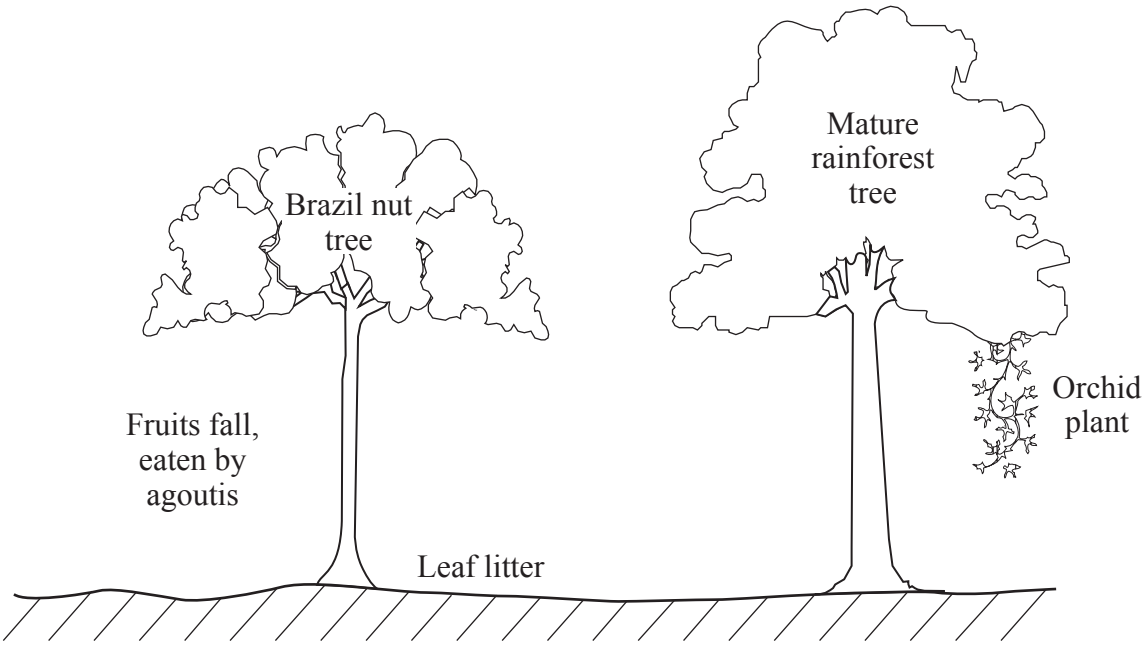
A Availability of liquid water
B Appropriate temperature range
C Light
D Atmospheric oxygen
E Stratospheric ozone
F Atmospheric CO_2

Reason why condition is necessary	Condition
solvent for the chemical reactions needed for life	**A**
absorbs biologically harmful UV radiation	
provides an energy source for photosynthesis	
allows efficient enzyme reactions	
allows aerobic respiration	
helps control the Greenhouse Effect	

(5 marks)

5

2 The diagram shows some of the ecological interactions involving a Brazil nut tree, *Bertholletia excelsa*.



2 (a) Orchid bees, *Euglossa* sp., are the only pollinators of Brazil nut tree flowers. These bees also need orchid plants that grow only on specific mature rainforest trees.

Suggest why Brazil nut trees will produce nuts only if the tree is surrounded by natural rainforest.

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(2 marks)

2 (b) Agoutis, *Dasyprocta* sp., are small ground-dwelling mammals which disperse Brazil nuts. They are the only animals that can open the Brazil nut fruit to allow germination.

2 (b) (i) Agoutis are prized for their meat.

Explain why Brazil nut tree populations may change if agoutis are excessively hunted.

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(2 marks)

2 (b) (ii) Describe a technique by which the population size of agoutis may be estimated.

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(3 marks)

2 (b) (iii) Brazil nut trees depend on a group of organisms, living in the soil around their roots, to supply nutrients.

Name this group of organisms.

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(1 mark)

2 (c) Explain why encouraging the sustainable production of Brazil nuts might be used as a method to support tropical rainforest conservation.

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(2 marks)

10

Turn over for the next question

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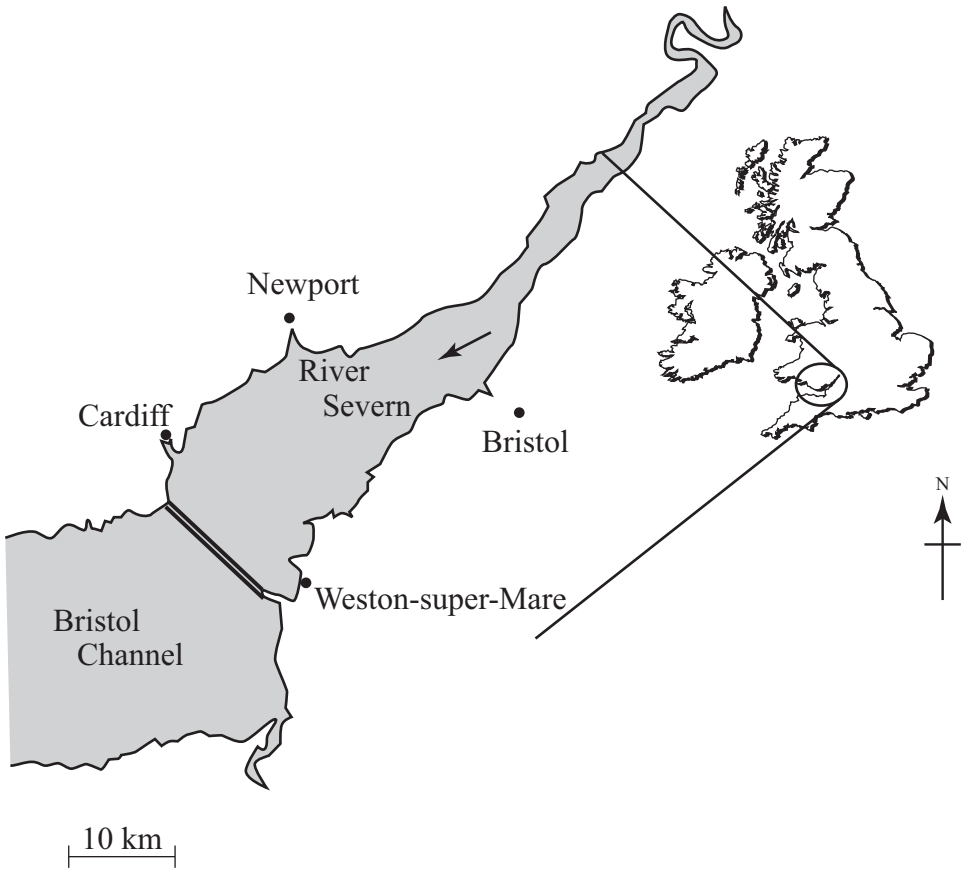
3 The diagram shows the location of the proposed Severn Estuary Tidal Barrage, which could provide a significant source of renewable energy for the UK.



Key

Proposed tidal barrage

3 (a) What types of evidence would a Public Inquiry use to assess the impact of the proposal?

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(3 marks)

3 (b) Objections to the Tidal Barrage proposal include concerns about the impact on the wildlife in the area.

Suggest **two** other land use conflicts that may result from the development.

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(2 marks)

3 (c) The RSPB objects to this Tidal Barrage proposal because the Severn Estuary is one of the most important sites for wetland birds in Britain.

Give an international designation that is used to protect wetland areas for birds.

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(1 mark)

3 (d) The estuary mudflats between the high and low tides are an important habitat for invertebrates on which many birds feed. Water behind the barrage will flow more slowly, and suspended sediment in the water is likely to settle.

Explain how this may affect the wildlife of the mudflats.

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(4 marks)

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4 (a) Flagship species are organisms that have a particular appeal to people so they are often used in wildlife conservation campaigns.

4 (a) (i) Give **two** economic reasons why wildlife conservation is important.

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(2 marks)

4 (a) (ii) Explain how other organisms may benefit from the conservation of flagship species.

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(2 marks)

4 (b) African elephants, *Loxodonta* spp., are flagship species that have been widely hunted for their ivory tusks.

Explain how the listing of elephants under CITES has helped to reduce elephant hunting.

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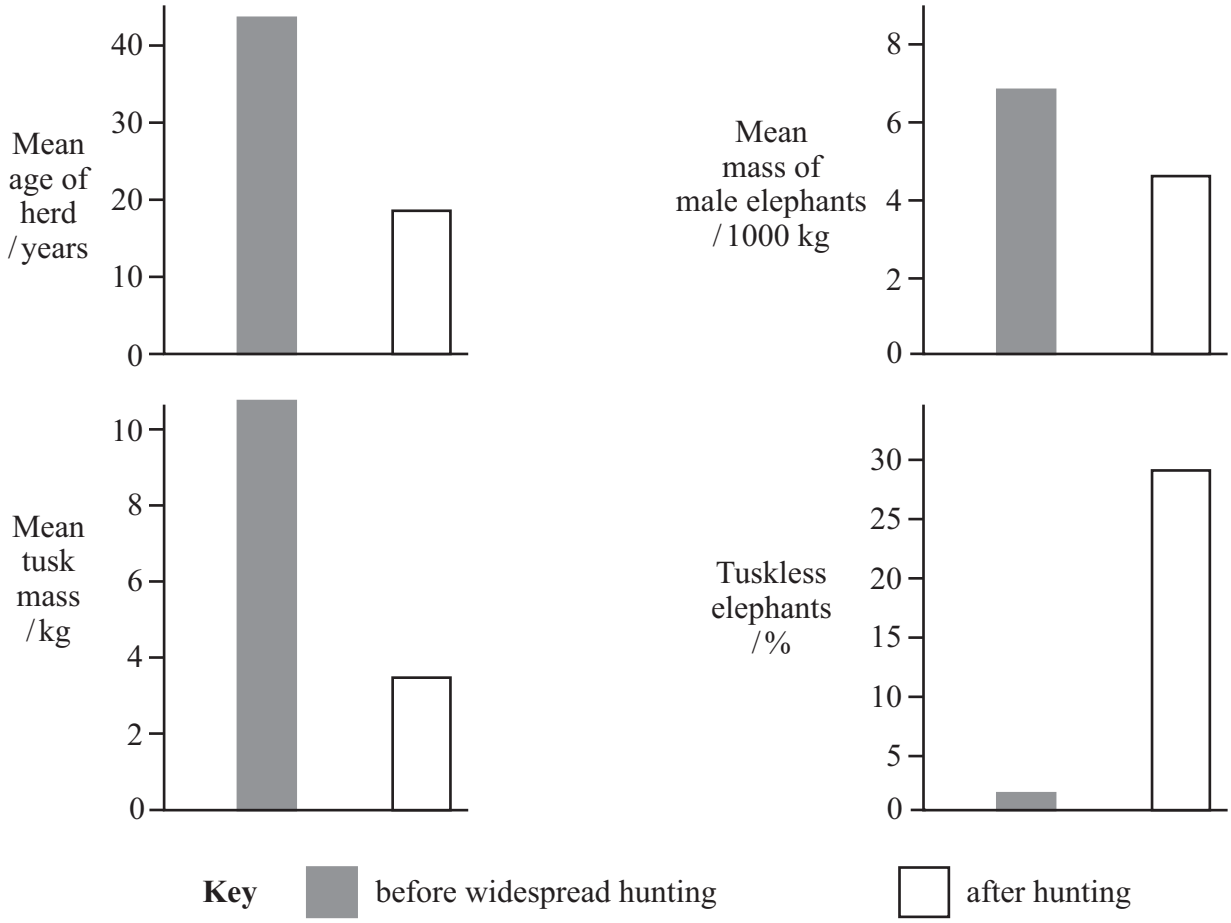
(2 marks)

4 (c) The bar charts show how an African elephant population changed as a result of hunting.



Explain why **one** of the features of the elephant population, shown in the bar charts, has changed.

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(2 marks)

Question 4 continues on the next page

4 (d) In 2001, scientists concluded that there are two separate species of African elephant: *Loxodonta africana*, the savannah elephant, and *Loxodonta cyclotis*, the forest elephant.

Explain how elephant conservation plans may be changed by the knowledge that there are two species of African elephant.

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(2 marks)

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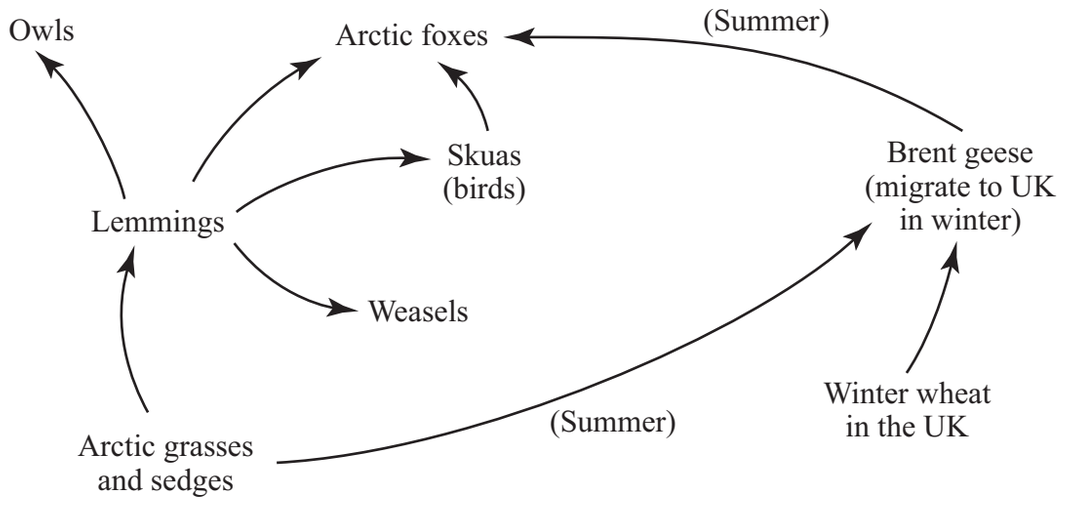
5 (a) The food web shows some of the feeding relationships in an arctic ecosystem.



Describe the possible impacts on this food web if farmers in the UK decided to cull the population of Brent Geese in order to protect their crops.

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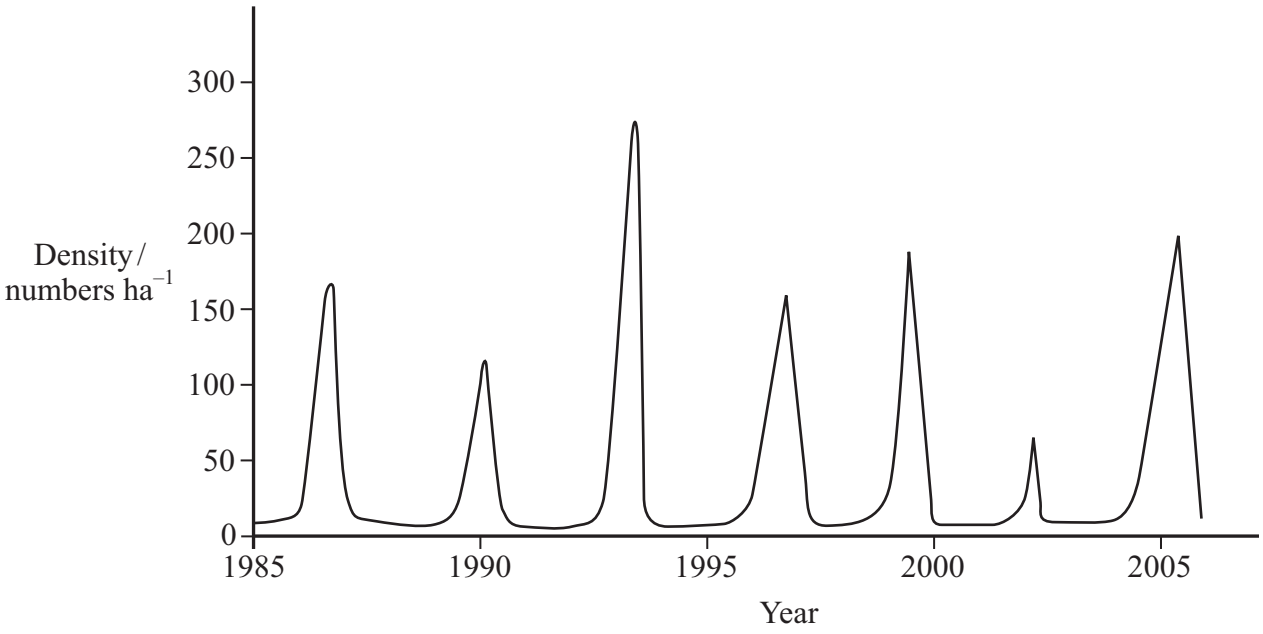
(3 marks)

Question 5 continues on the next page

5 (b) The graph shows the changes in a population of lemmings from 1985 to 2005.



5 (b) (i) Suggest a reason why the 2002 peak was unusually low.

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(2 marks)

5 (b) (ii) This arctic ecosystem has a low species diversity.

What information do you need to calculate the species diversity of an ecosystem?

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(2 marks)

5 (b) (iii) Explain how the slow rate of decomposition may affect the changes in lemming population density.

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(3 marks)

10

Turn over for the next question

6 (a) Explain why urban gardens are very important for wildlife despite their small total area.

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(3 marks)

6 (b) Suggest **two** reasons why the choice of plant species may affect the wildlife value of a garden.

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(2 marks)

6 (c) Describe how a garden may be surveyed for night flying moths.

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(3 marks)

6 (d) Unmanaged garden ponds may gradually lose their wildlife value. Use the process of succession to explain why the wildlife value of the pond changes.

Quality of Written Communication will be assessed in this answer.

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(7 marks)

15

END OF QUESTIONS

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